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FACTOR STRUCTURE AND DIAGNOSTIC RELATIONSHIPS

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The Health Opinion Survey in the Mental Health Clinic:  
Factor Structure and Diagnostic Relationships\*

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## The Health Opinion Survey in the Mental Health Clinic:

### Factor Structure and Diagnostic Relationships

#### Abstract

The purpose of the present study was to (a) determine the factor structure underlying responses of psychiatric outpatients to the Health Opinion Survey (HOS), and (b), assess variations in those dimensions among diagnostic subgroups. The sample was composed of 2,168 enlisted Navy personnel with modal age of 19-20 years. Principle components analysis yielded three interpretable dimensions: Depression, Anxiety, and Somatic Concerns. The salient variables defining each component were item analyzed to produce psychometrically acceptable subscales, and the relationships between scores on the HOS subscales and clinical diagnosis were explored. It was found that: (1) there was significant variation across diagnoses on each of the three subscales; (2) for each scale there was a notable difference between more disturbed and less disturbed outpatients; and (3) there was consistency in the relative scoring positions of the several diagnostic groups on HOS subscales. The HOS dimensions which emerged had both empirical and clinical validity, and the factor structure associated with the patient sample evidenced greater differentiation than that previously reported for nonclinical groups. It was concluded that the HOS subscales have potential clinical usefulness and warrant further development and refinement.

The Health Opinion Survey in the Mental Health Clinic:  
Factor Structure and Diagnostic Relationships

In the busy mental health services setting there is a need for a relatively brief, nonthreatening, self-administered index of mental health to complement the usual intake information related to background and current mental status. An instrument which could differentially tap important clinical factors and provide data relevant to diagnosis would be of particular value. The development of this type of tool becomes increasingly important as paraprofessionals assume greater responsibility for the gathering of intake information in the clinical setting.

A review of the literature suggests the potential clinical usefulness of the Health Opinion Survey (HOS) developed by Macmillan (1957) for epidemiological research. This instrument has the advantages of being brief (20 items), simple to administer, and innocuous. Further, it has been shown to be psychometrically sound (Butler & Jones, in press; Jegede, 1977; Tousignant, Denis, & Lachapelle, 1974) and significantly related to health status (Butler & Jones, in press; Gunderson, Arthur, & Wilkins, 1968; Pugh, Gunderson, Erickson, Rahe, & Rubin, 1972; Tousignant et al., 1974). With regard to factor analytic studies of the HOS and similar indices, findings have been somewhat mixed. However, two broad, interpretable dimensions--a physical symptoms and a psychological component--have consistently emerged (Butler & Jones, in press; Gurin, Veroff, & Feld, 1960; Phillips & Segal, 1969; Seiler, 1973; Seiler & Summers, Note 1;



Spiro, Siassi, & Crocetti, 1972).

Several studies involving the HOS relate directly to clinical phenomena. For example, HOS scores have been found to distinguish between psychiatric cases and nonpatients (Danley, Note 2; Gunderson et al., 1968; Macmillan, 1957; Spiro et al., 1972; Tousignant et al., 1974). In addition, total HOS scores have been found to vary consistently with the nature and degree of psychological disturbance (Danley, Note 2; Gunderson et al., 1968) as well as with clinical disposition and subsequent occupational adjustment (Erickson, Edwards, & Gunderson, 1973; Gunderson et al., 1968).

It has been suggested that the HOS factor structure for psychiatric patients may be somewhat different from that of nonpatients (Butler & Jones, in press; Spiro et al., 1972), but there has been little systematic study of this possibility. Thus, there remains a need to explore whether unique dimensions emerge in the HOS responses of diagnosed psychiatric patients and to assess interrelationships between such HOS dimensions and specific diagnoses. The purpose of the present investigation then was to (a) determine the factor structure underlying HOS responses obtained from a large sample of psychiatric outpatients and (b) assess variations in those dimensions among diagnostic subgroups.

#### Method

#### Subjects

The sample consisted of 2,168 Navy enlisted personnel who were seen for

psychiatric evaluation at one of 16 Navy outpatient facilities during one calendar year. The modal age was 19-20 years, and 80% of the patients were in their first enlistment. The diagnostic categories represented in the sample included a wide-range of psychiatric disorders; the largest number of cases (52%) were diagnosed as personality disorder.

#### Procedure

During the initial consultation period each patient completed a brief questionnaire designed to obtain demographic and military status information, social and family history, and the Health Opinion Survey (HOS). The latter instrument was presented in a Likert format ("Often," "Sometimes," or "Never"), with low scores representing a greater number of complaints. Following the intake interview the clinician recorded referral information, data pertaining to various attitudes of the patient, and diagnosis. Patients were grouped into eight diagnostic categories: Psychosis, Neurosis, Transient Situational Disturbance, Personality Disorder, Substance Abuse (Alcoholism, Drug Abuse), Sexual Deviations, Other Diagnoses (Psychophysiological Disorder, Special Symptoms), or No Psychiatric Disorder.

To determine the underlying factor structure of the HOS responses, a principal components analysis was conducted, and all components with eigenvalues  $\geq 1.0$  rotated to the varimax criterion. Based on the results of the components analysis, item analytic techniques were used to derive scales or composites to best reflect the dimensions produced. The resulting scores

were subsequently used to explore relationships between HOS symptom scales and psychiatric diagnoses. To this end, patients were grouped according to the psychiatric diagnoses indicated above, and analysis of variance techniques were employed to determine differences in HOS symptom scores.

### Results

#### Principal Components Analysis

The components analysis of the HOS item responses yielded four components accounting for 45.9% of the trace. Following varimax rotation, the individual components accounted for 11.8%, 11.9%, 15.5%, and 6.6% of the original item variance, respectively. The 20 HOS items, their rotated component structure loadings, and item communalities are shown in Table 1. For ease of interpretation, only loadings  $\geq \pm .40$  were shown.

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Insert Table 1 about here.

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Three of the four components produced were easily interpreted. The first component was dominated by a high negative loading on "feeling in good spirits" and a positive loading on "wondering if anything is worthwhile," strongly suggestive of a Depression dimension. The second component, labeled Somatic Concerns, reflected concerns about various aspects of physical health, including nonspecific ailments affecting different body parts, overall state of physical well-being, spells of dizziness, and feelings of general weakness. The third component involved a variety of specific symptoms, including hand tremors,

sweating, rapid heartbeat (without accompanying physical exertion), and frequent nightmares. These symptoms were indicative of an Anxiety pattern. The final component was uniquely defined by the two items "Smoking" and "Loss of appetite." Although these two items were significantly intercorrelated ( $r = .23$ ,  $p < .01$ ), because of the relatively small amount of variance associated with this component (6.6%) and its specificity, it was dropped from subsequent analyses.

The salient variables (i.e., those with loadings  $\geq \pm .40$ ) defining each component were item analyzed to produce psychometrically acceptable HOS subscales. These results are summarized in Tables 2 and 3. Specifically, Table 2 contains the five final defining items for each scale, their individual means, standard deviations, and item-total correlations. Table 3 shows, for each scale, the means and standard deviations calculated for the total sample, coefficient alphas, and the average item-total correlation for all five defining items. These results indicated acceptable internal consistency of the three scales produced and justified further analyses.

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Insert Tables 2 and 3 about here.

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#### Diagnostic Patterns and HOS Scores

Table 4 contains the means and standard deviations for the Somatic Concerns, Depression, and Anxiety subscales for each major diagnostic category. One-way analysis of variance comparisons of the mean values for each subscale

showed significant between-group variation across the eight diagnostic groups. In light of the three significant overall F-ratios, several additional, post hoc comparisons were made using Scheffe's t statistic. More specifically, closer examination of the mean values reported in Table 4 suggested that diagnostic groups could be combined in terms of amount of disturbance. Thus, a more highly disturbed group (composed of those diagnosed Psychotic, Neurotic, Transient Situational Disturbance, or Personality Disorder) was contrasted with a less disturbed group (those categorized as Substance Abuse, Sexual Deviation, Other Psychiatric Diagnosis, or No Psychiatric Diagnosis) in order to assess differences in scoring patterns. For each of these comparisons, significant differences were found (Somatic Concerns,  $t = 9.21$ ,  $p < .01$ ; Depression,  $t = 10.32$ ,  $p < .01$ ; Anxiety,  $t = 12.95$ ,  $p < .01$ ). Finally, no significant differences among mean values were found within the two categories of disturbance.

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Insert Table 4 about here.

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To illustrate the extent to which there was consistency among diagnostic subgroups in terms of their positions on the three HOS subscales, the scoring pattern is graphically presented in Figure 1. It is clear that the more pathognomonic values (i.e., lower scores) were repeatedly found among the psychotic group, whereas the highest scores were consistently observed in the sexual deviation group. The relative placement of the several diagnoses

according to HOS score was suggestive of an ordering or continuum of psychiatric disturbance. The degree to which there was reliability in such an ordering across subscales was reflected in the significant coefficient of concordance ( $W = .94$ , average  $r_s = .91$ ,  $p < .01$ ).

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Insert Figure 1 about here.

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#### Discussion

The discussion is organized around the two major goals of the study, namely, (a) the determination of the factor structure underlying HOS responses of psychiatric outpatients and (b) the assessment of variations in HOS patterns across diagnostic groups. First, the results of the components analysis clearly revealed the presence of three interpretable major dimensions: Somatic Concerns, Depression, and Anxiety. This finding supports the idea of multidimensionality in the HOS and related indices (e.g., Butler & Jones, in press; Gurin et al., 1960; Seiler, 1973; Spiro et al., 1972), but its importance is more evident if considered in relation to previously reported findings.

Most investigators have concluded that the HOS is basically composed of two subscales, a physical and a psychological dimension. Subjects in such studies were typically drawn from a nonclinical setting. The results of the present study were notable in that for psychiatric outpatients there were two distinct psychological components (Depression and Anxiety) in addition to a

dimension reflecting physical concerns. Thus, there is greater differentiation of the psychological component among patients than in nonclinical groups. A somewhat similar pattern was found in a preliminary study which involved only 30 psychiatric patients (Spiro et al., 1972), and Butler and Jones (in press) earlier had speculated about the possibility of greater factor complexity among psychiatric patient groups.

From a clinical perspective, the three factors which emerged in the HOS response pattern are consistent with symptomatology frequently observed in the mental health setting. Common features among psychiatric patients are those of somaticization of fears or conflicts, discouragement and depression, and tension and anxiety. Although these "themes" often occur in combination (e.g., depressive neurosis), one of the features usually predominates. Clinically, then, the three HOS components have a certain degree of validity.

With regard to the relationship between HOS scoring patterns and psychiatric diagnosis, several points are noteworthy. First, there was significant variation across diagnoses on each of the three HOS subscales. Furthermore, for each scale there was a notable difference between outpatients whose diagnosis implied a more severe psychological disturbance and those who were less disturbed. Finally, there was consistency in the relative positions of the several diagnostic groups on HOS subscales.

Although previous investigators anticipated the possibility of differential HOS response patterns and intensities for various diagnostic groups (e.g.,

Gunderson et al., 1968), results have been equivocal in research bearing upon the extent to which the HOS and related instruments could detect degrees of psychological disturbance. Both Dohrenwend and Crandell (1970) and Seiler (1973) asserted that such scales could not be used to rank order the degree of mental illness, whereas other investigators have concluded that degrees of psychological impairment can be differentiated by those symptom check-lists (Danley, Note 2; Gunderson et al., 1968; Manis, 1964). The results of the present study suggest that HOS subscale score patterns are related to the extent and type of psychological disturbance, indicating the possible usefulness of this type of instrument in the mental health setting. Additional research is needed in order to gain understanding of the relationships between HOS patterns and other clinically salient features and decisions (e.g., mental status, treatment recommendations, treatment motivation, and disposition) and to allow further refinement of the instrument.

In light of the tendency for the several diagnostic groups to maintain their relative scoring positions across HOS subscales, note was taken of the exception to the pattern found among the patients in the "Other Psychiatric Diagnosis" category. This group had the second mildest scores on both psychological subscales, but moved toward a position suggestive of more disturbance on the Somatic Concerns factor. Closer analysis of the composition of the "Other" patient group revealed that 46% carried a diagnosis which clearly involved a physical component (e.g., Psychophysiological Disorder, Cephalgia, or Other Psychomotor Disorder). Such observations lend further validity

to the HOS subscales and reinforce the idea that these scales should prove clinically useful with further development.

Another finding that warrants mention is the consistency with which those in the Sexual Deviation category obtained HOS scores suggestive of a symptom-free status. One inference might be that such patients were the least disturbed among the several diagnostic groups, including those assessed as having no psychiatric disorder. However, clinical observations of this group suggest that some have been apprehended by military authorities and wish to leave the military service as soon as possible but deny any significant personal problems.

Future research should extend the investigation of the HOS factors in both clinical and nonclinical populations. It would be fruitful, for example, to systematically determine the validity of the Anxiety factor in terms of other indicators of anxiety, both clinical ratings and other self-report measures (e.g., the Taylor Manifest Anxiety Scale). Similar approaches could be used in assessing the validity of the Depression and Somatic Concerns scales. Attention should also be given to the relationships between HOS scoring patterns and additional variables of clinical importance such as mental status, disposition, prognosis, and subsequent occupational adjustment. The results of such research would provide further evidence concerning the potential usefulness of the HOS in the mental health clinic setting.

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Table 1  
 Rotated Component Structure Loadings of  
 Health Opinion Survey Responses

<u>Item</u>	<u>Rotated Component Structure Loadings<sup>a</sup></u>				
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u><math>h^2</math></u>
1. Do you have any physical or health problems at the present?		-.60			.39
2. Do your hands ever tremble enough to bother you?			.53		.46
3. Are you ever troubled by your hands or feet sweating so that they feel damp and clammy?			.65		.46
4. Have you ever been bothered by your heart beating hard?			.57		.44
5. Do you tend to feel tired in the morning?	.48				.39
6. Do you have any trouble getting to sleep and staying asleep?	.54		.42		.49
7. How often are you bothered by having an upset stomach?			.47		.32
8. Are you ever bothered by nightmares?			.51		.44
9. Have you ever been troubled by "cold sweats"?			.56		.41
10. Do you feel that you are bothered by all sorts of ailments in different parts of your body?			-.61		.45
11. Do you smoke?				.84	.72
12. Do you ever have loss of appetite?	.45			.40	.48

<sup>a</sup>Only loadings  $\geq \pm .40$  are reported.

Rotated Component Structure Loadings

<u>Item</u>	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u><math>h^2</math></u>
13. Has any ill health affected the amount of work you do at home or on the job?		-.59			.42
14. Do you ever feel weak all over?	-.46	.44			.49
15. Do you ever have spells of dizziness?	-.48	.43			.47
16. Do you tend to lose weight when you worry?					.32
17. Have you ever been bothered by shortness of breath when you are not exerting yourself?	-.43				.44
18. For the most part, do you feel healthy enough to carry out the things you would like to do?		.59			.54
19. Do you feel in good spirits?	-.73				.58
20. Do you sometimes wonder if anything is worthwhile anymore?		.65			.45

Table 2

Results of Item Analysis of Salient Variables Defining  
 Depression, Somatic Concerns, and Anxiety Subscales<sup>a</sup>

<u>Item</u>	<u>Mean</u>	<u>S.D.</u>	<u>r<sub>it</sub></u>
<b>Depression:</b>			
Do you tend to feel tired in the morning?	1.72	.66	.47
Do you have trouble getting to sleep and staying asleep?	1.85	.75	.52
Do you ever have loss of appetite?	1.96	.66	.45
Do you feel in good spirits? (Reverse scored)	2.26	.60	.49
Do you sometimes wonder if anything is worthwhile anymore?	1.74	.68	.41
<b>Somatic Concerns:</b>			
Do you ever feel that you are bothered by all sorts of ailments in different parts of your body?	2.64	.56	.47
Has any ill health affected the amount of work you do at home or on the job?	2.47	.63	.44
Do you ever feel weak all over?	2.25	.62	.56
Do you ever have spells of dizziness?	2.39	.64	.53
Have you ever been bothered by shortness of breath when not exerting yourself?	2.56	.62	.43
<b>Anxiety:</b>			
Do your hands ever tremble enough to bother you?	2.19	.65	.51
Are you ever troubled by your hands or feet sweating so that they feel damp and clammy?	2.11	.71	.49

<sup>a</sup>N = 2,168; possible score range, 5-15.

<u>Item</u>	<u>Mean</u>	<u>S.D.</u>	<u>Fit</u>
<u>Anxiety: (continued)</u>			
Have you ever been bothered by your heart beating hard?	2.32	.67	.45
Are you ever bothered by nightmares?	2.34	.69	.42
Have you ever been troubled by "cold sweats"?	2.58	.57	.46

Table 3  
Psychometric Characteristics of HOS Subscales:

Depression, Somatic Concerns, Anxiety<sup>a</sup>

<u>Scale</u>	<u>Mean</u>	<u>S.D.</u>	<u>Coefficient Alpha</u>	<u>Average <i>r</i>it</u>
Depression	9.53	2.28	.71	.47
Somatic Concerns	12.30	2.12	.73	.49
Anxiety	11.54	2.23	.71	.47

<sup>a</sup>N = 2,168. Number of items in each scale = 5; possible score range = 5-15. All scales were scored so that higher scores indicated fewer symptoms reported.

Table 4

Means and Standard Deviations of HOS Subscales for Each Diagnostic Group<sup>a</sup>

HOS Subscale	Diagnostic Group					Other Psychiatric Diagnosis (n = 257)	No Psychiatric Diagnosis (n = 50)	$\Sigma^b$
	Transient Situational Disturbance (n = 373)	Personality Disorder (n = 747)	Sexual Deviation (n = 47)	Substance Abuse (n = 257)				
Somatic Concerns	11.27 (2.33)	11.69 (2.13)	12.34 (2.12)	11.90 (2.12)	13.42 (1.58)	12.96 (1.83)	12.44 (2.29)	12.72 (2.04)
Depression	10.75 (2.56)	11.01 (2.18)	11.21 (2.28)	11.18 (2.16)	12.66 (1.67)	12.11 (2.12)	12.19 (2.12)	12.11 (2.18)
Anxiety	8.74 (1.74)	8.96 (2.13)	9.34 (2.10)	8.94 (2.11)	11.40 (1.72)	10.14 (2.31)	10.88 (1.98)	10.21 (2.40)

<sup>a</sup>Total N = 2,168; standard deviations are shown in parentheses.<sup>b</sup>df = 7,2160; p < .001 for all values.

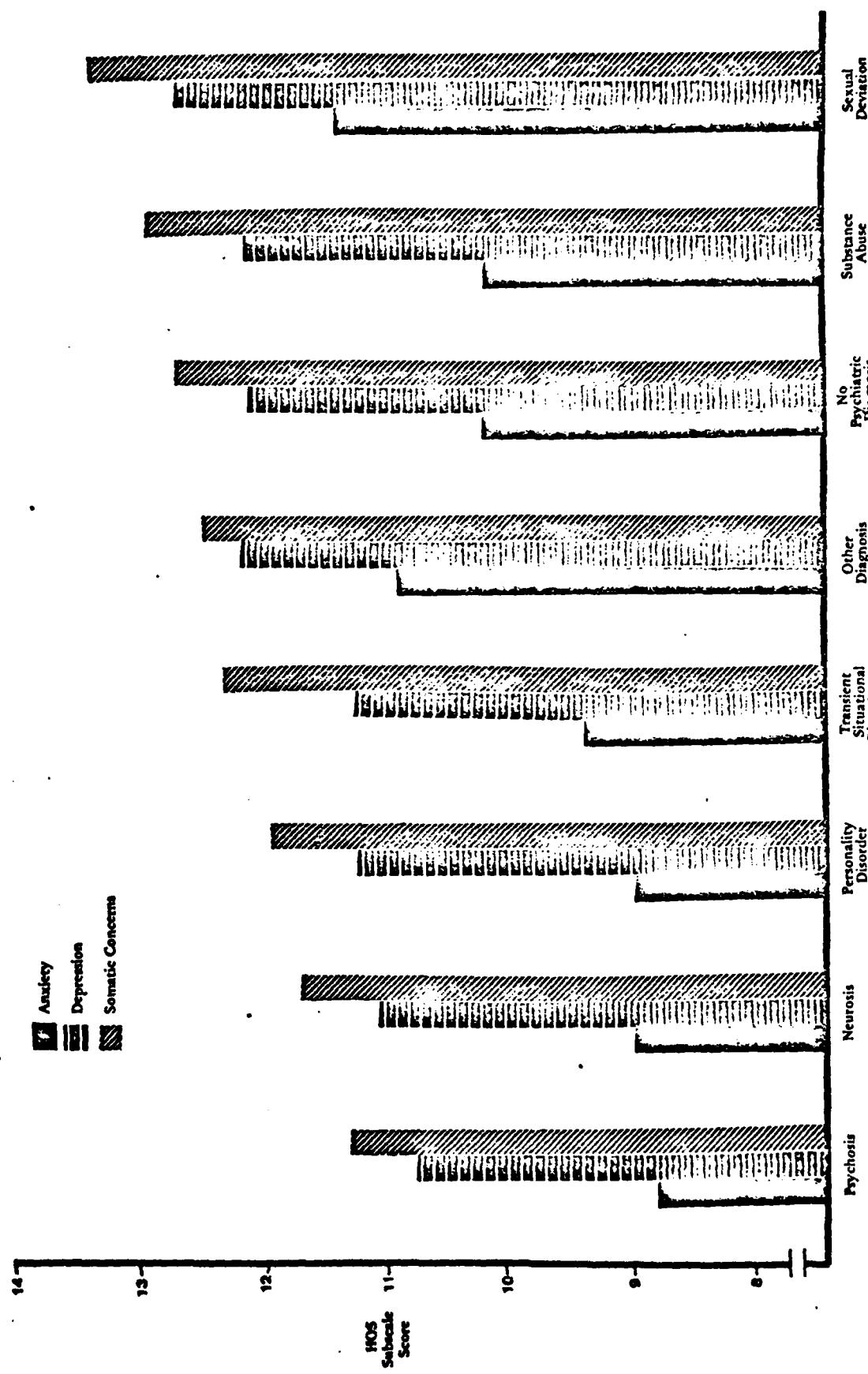


Figure 1. Average Scores of Diagnostic Groups on HOS Subscales

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